

CLAIMS

I claim:

1. A method of cleaving a target RNA molecule comprising the step of exposing the target molecule to an eukaryotic tRNA splicing endonuclease, wherein the target molecule is in the bulge-helix-bulge conformation, wherein cleavage occurs within the bulge-helix-bulge and cleavage products are generated, and wherein the target molecule does not comprise a tRNA structure.
2. The method of claim 1 wherein the bulge-helix-bulge conformation is obtained by hybridizing the target RNA with an oligonucleotide designed to form a bulge-helix-bulge conformation.
3. The method of claim 1 wherein the bulge-helix-bulge conformation is obtained by hybridizing the target RNA with a second RNA wherein the hybridized target RNA and second RNA form a bulge-helix-bulge conformation.
4. The method of claim 1 wherein the target molecule is an mRNA molecule.
5. The method of claim 2 wherein the oligonucleotide comprises an RNA molecule.
6. The method of claim 2 wherein the oligonucleotide comprises a DNA molecule.

7. The method of claim 2 wherein the oligonucleotide comprises at least one nucleotide that is not a ribonucleotide.

8. The method of claim 2 wherein the oligonucleotide is between 58 and 62 nucleotides.

9. The method of claim 1 wherein the cleavage is within a cell.

10. The method of claim 1 wherein the cleavage is *in vitro*.

11. The method of claim 1 wherein the cleavage is *in vivo*.

12. A method of cleaving a target RNA molecule comprising the step of exposing the target molecule in a cell to heterologous archaeal tRNA splicing endonuclease, wherein the target molecule is in the bulge-helix-bulge conformation, wherein cleavage occurs between the second and third nucleotides at the bulges and cleavage products are generated, and wherein the target molecule does not comprise a tRNA structure.

13. The method of claim 12 wherein the bulge-helix-bulge conformation is created by two mRNA molecules, wherein the two mRNA molecules are the target RNA molecule and a second RNA molecule.

14. The method of claim 12 additionally comprising the step of ligation of cleavage products from the target RNA and the second RNA, wherein a fusion RNA

is formed comprising at least one cleavage product from the first target RNA molecule and at least one cleavage product from the second target RNA molecule.

15. The method of claim 12 wherein the cell is selected from the group consisting of mammalian, plant and eubacteria.

16. The method of claim 15 wherein the cell is mammalian.

17. The method of claim 12 wherein the cell is a eukaryotic cell.

18. A method of recombining a target RNA molecule with an exogenous RNA molecule comprising the step of exposing the target RNA molecule and the exogenous RNA molecule to a ligase, wherein the target RNA molecule is in the bulge-helix-bulge conformation, wherein the target RNA has been cleaved within the bulge-helix-bulge, and wherein the target RNA molecule and the exogenous RNA molecule recombine across the bulge-helix-bulge.

19. The method of claim 18 wherein the cell is selected from the group consisting of mammalian, plant and eubacteria.

20. The method of claim 19 wherein the cell is mammalian.

21. The method of claim 19 wherein the cell is a eukaryotic cell.

22. A transgenic animal comprising a gene encoding an archaeal tRNA endonuclease.

23. The transgenic animal of claim 22, wherein the animal is a mouse.